DOCUMENT RESUME

ED 287 260 EC 200 568

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TITLE	Interactive Video for Special Education. Digest #440.
INSTITUTION	ERIC Clearinghouse on Handicapped and Gifted Children, Reston, Va.
SPONS AGENCY	Office of Educational Research and Improvement (ED), Washington, DC.
PUB DATE	86
CONTRACT	400-84-0010
NOTE	3p.
AVAILABLE FROM	ERIC Clearinghouse on Handicapped and Gifted Children, 1920 Association Dr., Reston, VA 22091 (4 titles free, $1.00 for each additional set of 4 titles).
PUB TYPE	Information Analyses - ERIC Information Analysis Products (071)
EDRS PRICE	MF01/PC01 Plus Postage.
DESCRIPTORS	Computer Assisted Instruction; *Disabilities; Elementary Secondary Education; *Interactive Video; *Videodisks
IDENTIFIERS	ERIC Digests

ABSTRACT

This brief analysis defines a videodisc, describes the term "interactive video" and distinguishes among three categories of videodisc systems, defined according to the level of interactivity they provide. Advantages and applications of videodisc (e.g., simulations) are noted. A final section describes selected projects focusing on the use of videodiscs in special education instruction. (JW)

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1986 DIGEST #440

INTERACTIVE VIDEO FOR SPECIAL EDUCATION

The term *interactive video* is generally applied when a microcomputer is used in combination with a videodisc player. The resulting medium blends all the capabilities of the microcomputer with the vast information storage of the videodisc.

What is a Videodisc?

A videodisc is a medium for storing large amounts of information. The disc resembles a 12" phonograph record but stores both sound and visual information for playback on a television monitor. The basic videodisc system consists of the disc itself and a disc player which is interfaced with a standard television set. The pages of a book, motion sequences complete with sound, still pictures such as slides and photographs, and graphic animations can be stored on a single disc.

Best suited to interactive video is the laser disc which has a silvery, grooveless surface that covers and protects the information stored on the disc. The videodisc player directs a laser through the surface onto the inner layer where information is stored in encoded form by pits or reflective areas. Laser discs are resistant to nicks and scratches and immune to wear because nothing touches the encoded surface.

A laser disc can store 54,000 still frames of video per side, which is about 30 minutes of uninterrupted full-motion video. Laser discs also offer the option of dual audio tracks. The tracks can be played simultaneously for stereo sound, or separately to allow for a bilingual soundtrack or narration suitable for different age groups or learning levels.

Optical encoded discs have a tremendous storage capacity that can accommodate a range of video formats. They are extremely durable and offer the first truly interactive video capability that can be used in a wide variety of applications.

What does the Term *Interactive* Mean?

The term *interactive video* implies that the learner is actively engaged in the lesson and often controls the course of an instructional sequence through responses to the information presented. All forms of interactivity in this format are based on branching. Branching occurs through the use of two basic conventions: a multiple choice or a free response. In either case, branching to another part of the disc occurs when an option is selected by the learner.

The degree of interactivity depends on the capability of the videodisc delivery system or hardware. A videodisc player interfaced with a television monitor has certain interactive capabilities. When the player and the monitor are used with a microcomputer, interactive capabilities increase significantly. Videodisc systems are divided into three categories, according to the level of interactivity they provide.

Level I discs are designed for an inexpensive consumer player. Simple control functions, such as stop, rewind, and fast forward, are operated manually from a keypad. The disc itself has no programming. The user can simply play the videodisc or manually branch to other locations on the disc. The rate of presentation can be varied. A Level I disc may be encoded to stop in a single frame where the user may be quizzed, given additional instructions, or offered another option. It is also possible to create simple feedback loops using the built-in features of the player. With these techniques the user may exercise a limited amount of control of a lesson.

A Level II disc is designed for use on a videodisc player with a built-in microprocessor. In this case, there is programming on the disc. The microprocessor in the player reads these programs and automatically branches to different segments based on the student's responses to multiple choice questions. Although Level II discs are described as interactive, their response analysis capability is limited by the memory available in the player.

Level III discs are designed for use on a videodisc player that is interfaced with a microcomputer. Unlike Levels I and II, in Level III all programming is controlled by the external microcomputer. Often called intelligent videodisc, this level has greatly enhanced options for structuring a lesson, posing questions, and responding to learner input. At Level III the features of computer-based instruction are combined with high quality video to deliver the full power of interactive video.

What Are The Advantages of Videodisc Technology?

The combination of excellent video quality, rapid access, and computer control makes it easy to simulate realistic experiences on videodisc. Response time is fast enough to give the learner a feeling that a conversation is taking place. Good pacing is important because it holds the interest of the user, and an interactive system requires that the user be actively involved in the instructional process.

Although an interactive videodisc is rather expensive to develop, the cost of duplication is relatively low. Consumer costs for both hardware and software are gradually coming down as the use of this new technology grows. In general, the availability of programs is also on the increase. However, the quantity of videodisc courseware for use in the schools is still limited, as is the quantity of hardware found in the schools.

What Are Some Applications of Videodisc?

Interactive video is being used to simulate experiences that are potentially dangerous in real life, such as crossing a busy street in a wheelchair, flying and landing an airplane, or doing a security check through dark hallways. One of the first successful discs was developed by the American Heart Association and was used for CPR (cardio-pulmonary resuscitation) training. Their studies show that learning time was cut by two-thirds and retention rate doubled.

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How Have Videodiscs Been Used for Special Education Instruction?

One of the first interactive videodisc projects in the field of education was the Media Development Project of the Hearing Impaired at the University of Nebraska. The discs included instruction in social studies, language development, and finger spelling. A Level III disc series called "Thinking It Through" taught interactive thinking skills. Students could explore decision-making processes and the consequences of different responses to a problem or situation.

The California School for the Deaf at Riverside developed an interactive videodisc for teaching language and reading skills to hearing impaired students. The purpose of the program was to increase exposure to motivating language and reading experiences. An authoring system component provided ten interactive formats. Students were branched through the instructional sequences on grammar, syntax, categorization, capitalization, spelling, and punctuation.

At Utah State University, three projects were conducted under the auspices of the Interactive Videodisc for Special Education Technology (IVSET) program. Hardware and software components were developed to produce CAI (computer-aided instruction) materials for mentally handicapped students, a bilingual assessment instrument for mathematics skills, and an instructional program to teach social skills to behaviorally handicapped students.

A current investigation at the University of Pennsylvania involves a new method for teaching young children to read and write. The study incorporates the use of microcomputer and videodisc players to initiate communication at the very onset of instruction. Deaf and multiply handicapped children are included in the program. Preliminary results demonstrate a significant improvement in word and phrase identification, reading comprehension, and basic sentence construction.

At the University of Iowa, an interactive videodisc system is being used to train teachers and clinicians in classroom observation skills. The program provides complete training in the use of the Classroom Behavior Record (CBR) with children referred for psychiatric services. The training side of the disc contains motion samples of classroom behavior and glossary information. The practice side provides extended motion samples of classrooms and can be used for practice and reliability testing.

These examples of the successful use of interactive videodisc technology in special education suggest that the potential is well understood and that special educators will continue to explore the effective use of this technology. For more information about the projects highlighted in this digest, contact:

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Office of Educational Research and Improvement
U.S. Department of Education

This publication was prepared with funding from the U.S. Department of Education, Office of Educational Research and Improvement under contract no. 400-84-0010. The opinions expressed in this report do not necessarily reflect the positions or policies of OERI or the Department of Education.